



Assessment of Fish Passage Opportunities in Lower Hudson River Tributaries (2009-2014)

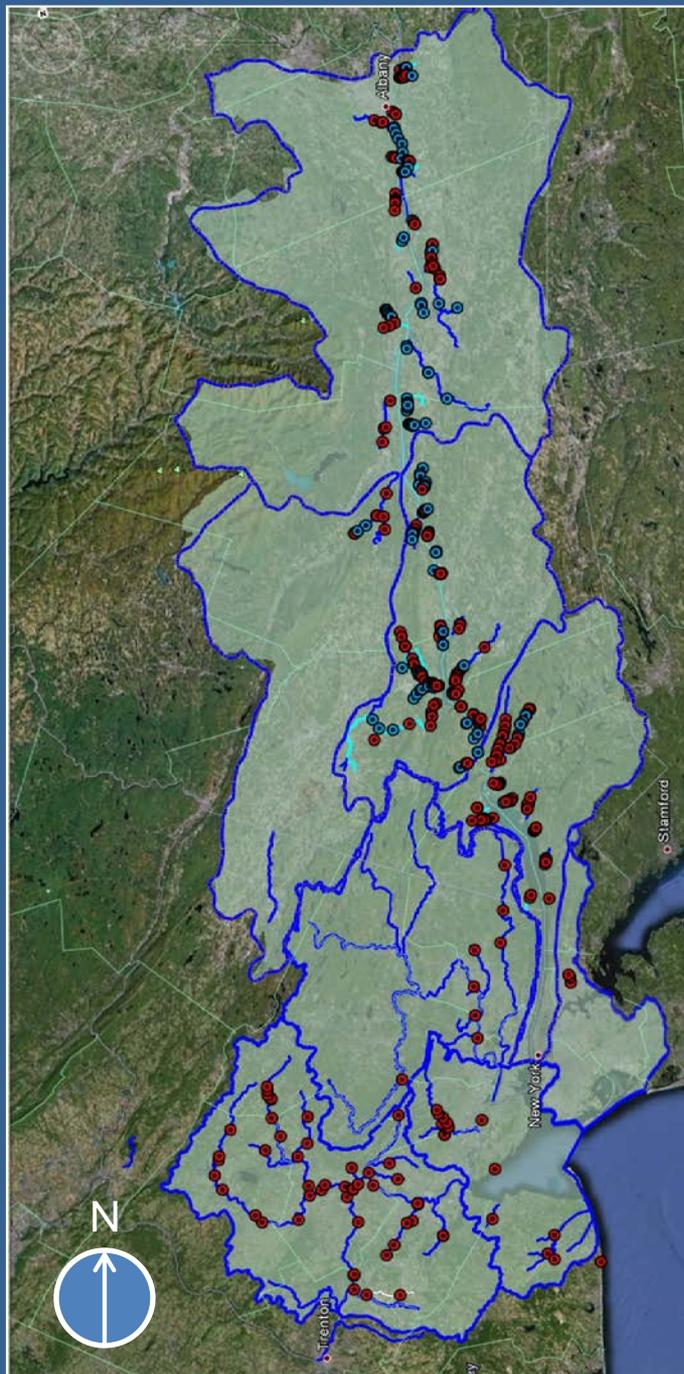
Presentation to Hudson River Inaugural Fish Passage
Coordination Meeting, Albany NY,
Oct. 29, 2014

Carl Alderson, NOAA Restoration Center

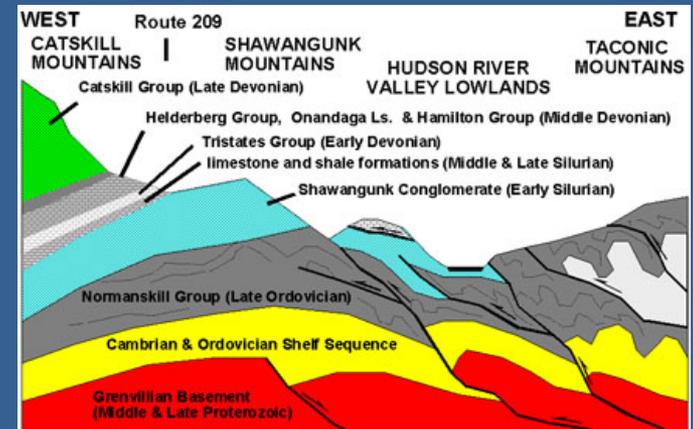
Lisa Rosman, NOAA, Office of Response and Restoration

NOAA led Barriers Studies within the Hudson –Raritan Estuary.

Note the Spatial Patterns made by the Tributary barriers of the Hudson River in contrast with the barriers studied in the area of New York Harbor (Raritan, Passaic, Hackensack, Bronx Rivers and lesser tributaries).



The barriers in the New York Harbor Area are distributed throughout the low gradient rivers in the watershed, whereas the barriers studied on the Hudson Tributaries tightly cluster near the Hudson River main stem due to the steep terrain of the Hudson Valley



Study Scope: Sixty Seven Hudson Tributaries



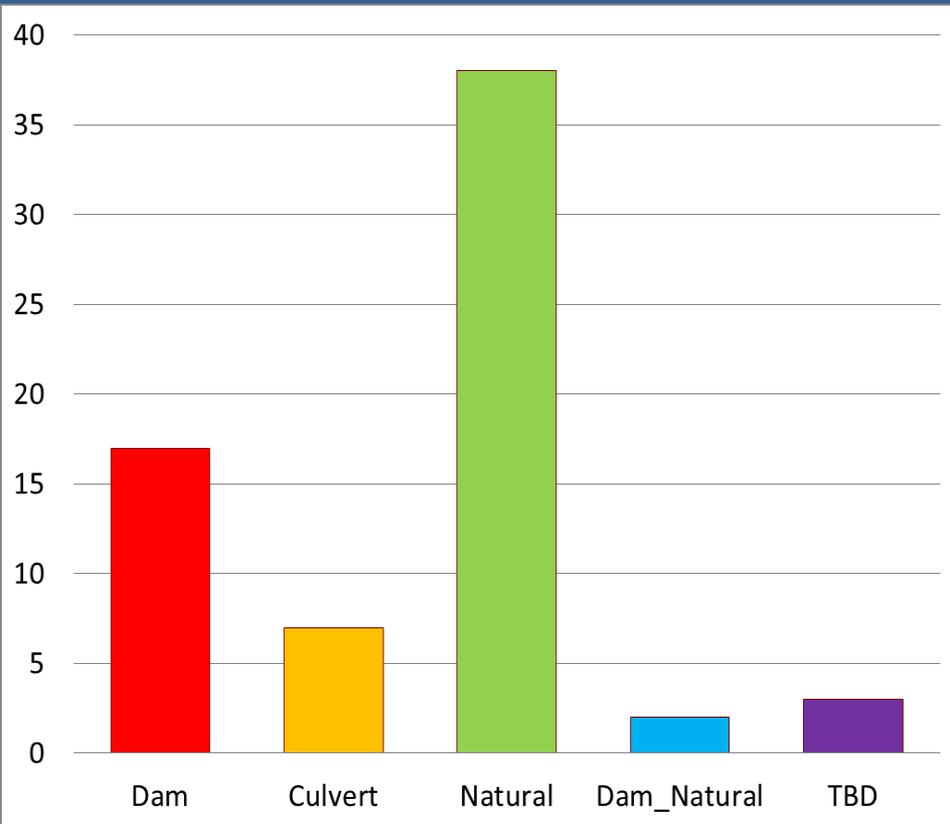
Annsville Creek	Fallkill	Mill Creek (R)	Saw Kill
Arden Brook	Fallsburgh Creek	Minisceongo Creek	Saw Mill River
Black Creek	Fishkill Creek	Moodna Creek	Sing Sing Brook
Breakneck Brook	Foundry Brook	Moordener Kill	South Bay Creek
Catskill Creek	Furnace Brook	Muitzes Kill	South Lattintown Creek
Cedar Point Brook	Gordons Brook	Murderers Creek	Sparkill Creek
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Coeymans Creek	Hunters Brook	Peekskill Hollow Brook	Stony Creek
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Dickey Brook	Lattintown Creek	Roeliff Jansen Kill	Wappingers Creek
Esopus Creek	Maritje Kill	Rondout Creek	Wickers Creek
	Mill Creek (C)	Roseton Brook	Wynants Kill

NOAA STUDY IN PROGRESS 2009-2014



60 Tributaries Visited	277 Barriers Field Visited	281 Stream Miles in the Survey
7 Tributaries NOT Visited	134 Barriers Not Visited	4.19 Average #Miles/Stream
67 Tributary Streams	411 Total Barriers	6.13 Average # Barriers per Tributary
		0.68 Average distance in miles between barriers

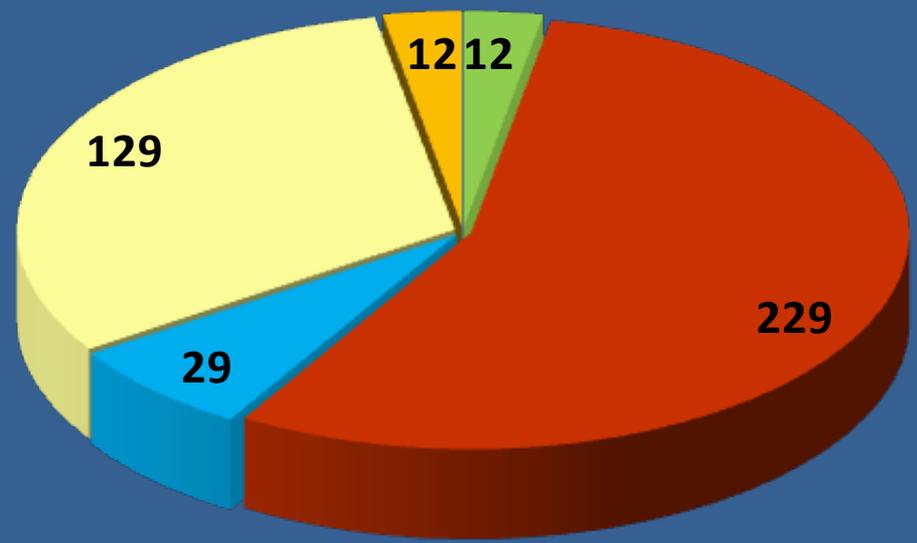
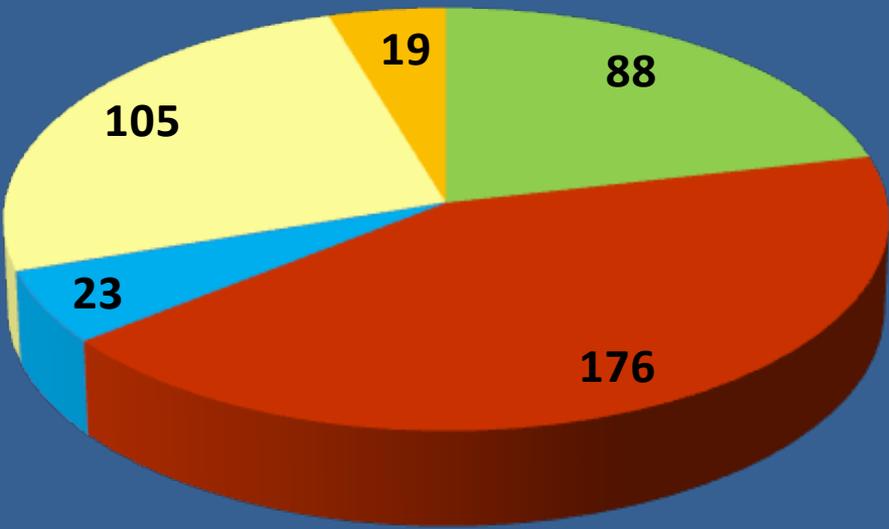
What is the First Barrier to Passage on the 67 Tributaries?



Approximately 65 miles accessible to river herring

For all 411 perceived barriers, we asked, can diadromous fish potentially arrive at this point?

.....And do (can) diadromous fish go beyond this point?



- All Diadromous
- No Diadromous
- High Flow Diadromous
- Eel Only
- TBD

- Passes All Diadromous
- No Passage Any Diadromous Species
- High Flow Diadromous
- Eel Only
- TBD

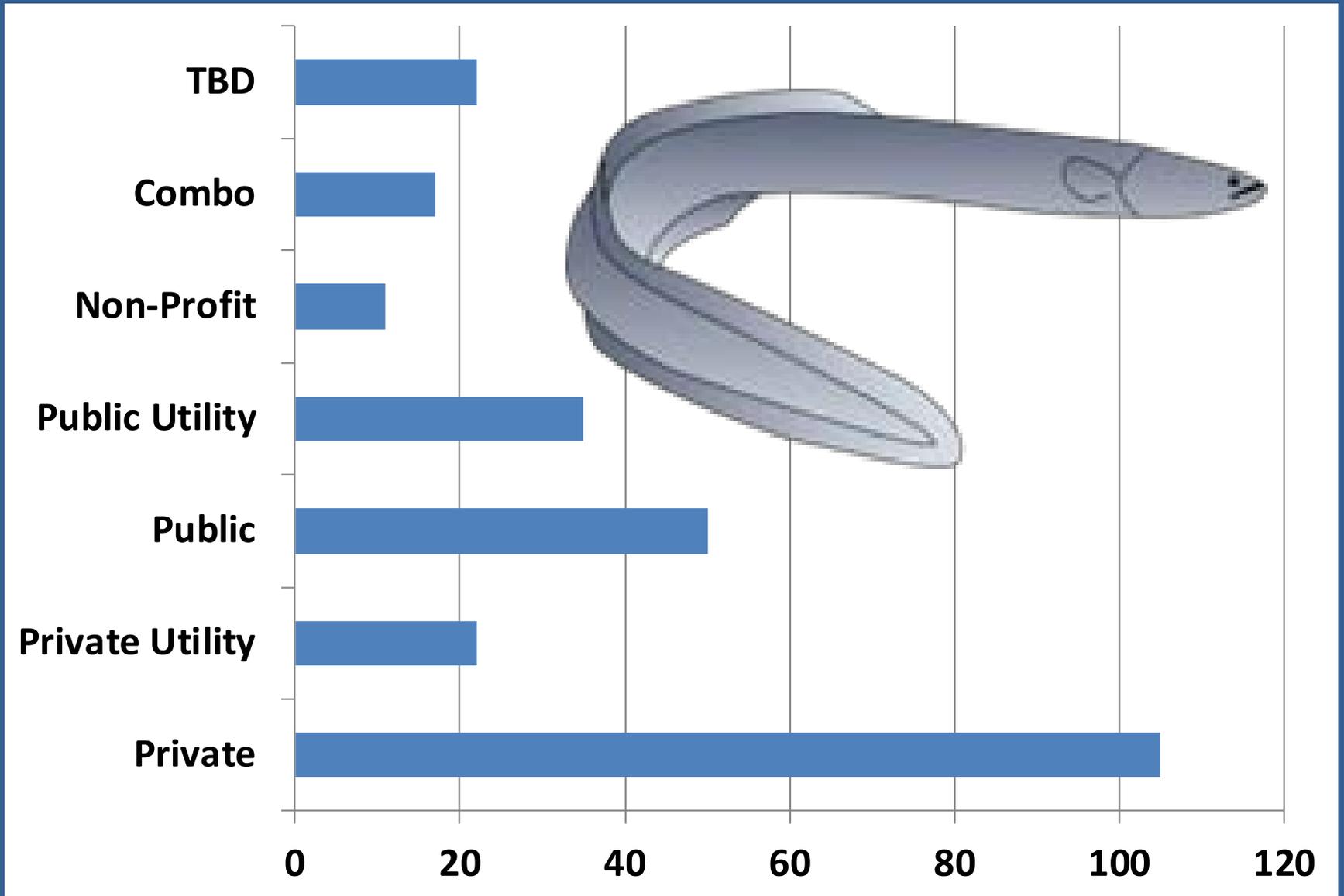
BARRIER EFFECTIVENESS



USES

Open Water	156
Abandoned	59
Transportation	51
Recreation	41
TBD	30
Residential	20
Hydroelectric	13
Other	13
Irrigation	11
Water Supply	7
Historic Site	4
Water Control	4
Fire Protection Etc	2
TOTAL	411

Man-Made Barrier Ownership



Claverack Creek



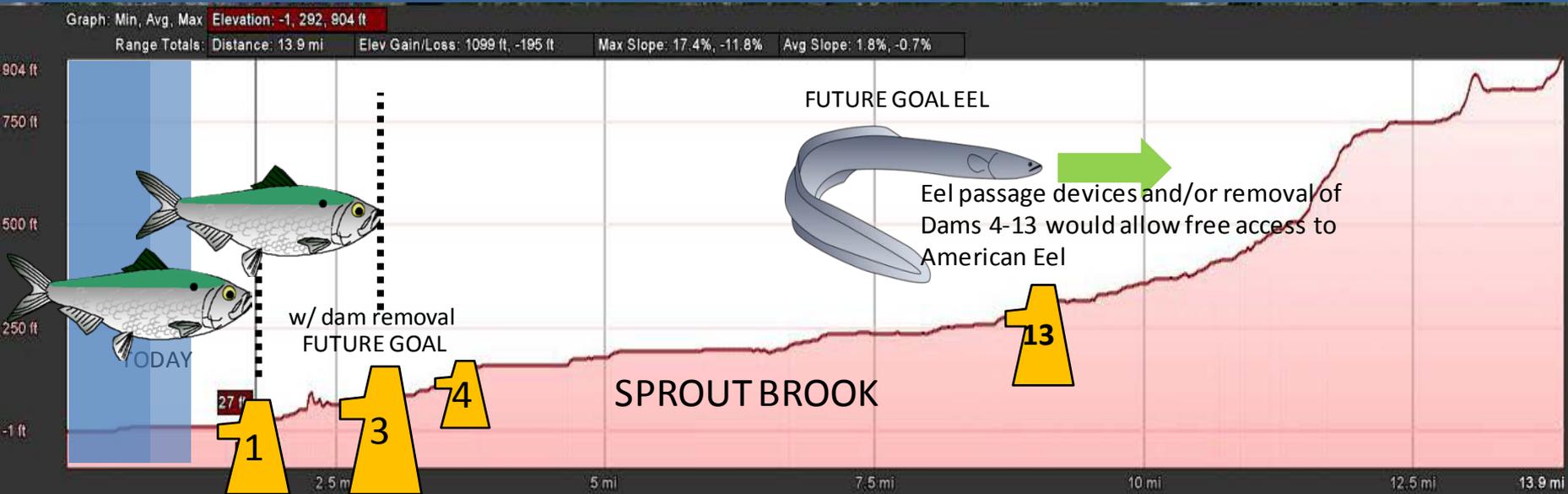
CLAVERRACK CREEK: The spillway of Dam #1 is approx 24' elevation above the elevation at the mouth. It is a full barrier to fish passage.

Dam #2 is breached and does not effect passage. Removal of Dams 1, 3 and 4 results in an additional **2.62 miles** of passage for herring.

Removal of dams 1,3,4 would allow herring to pass to RM 4.5 where Dam #5 Stottsville Dam/Falls would present an obstacle to fish but dam removal could benefit eel.

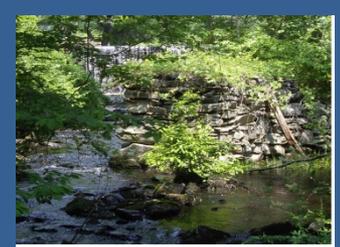
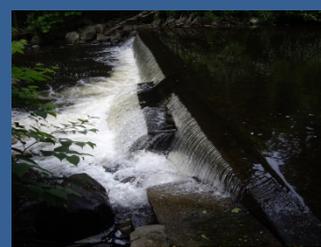
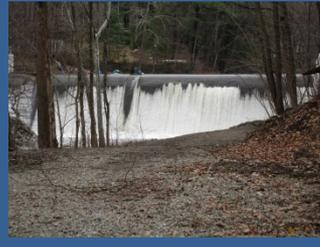


Sprout Brook

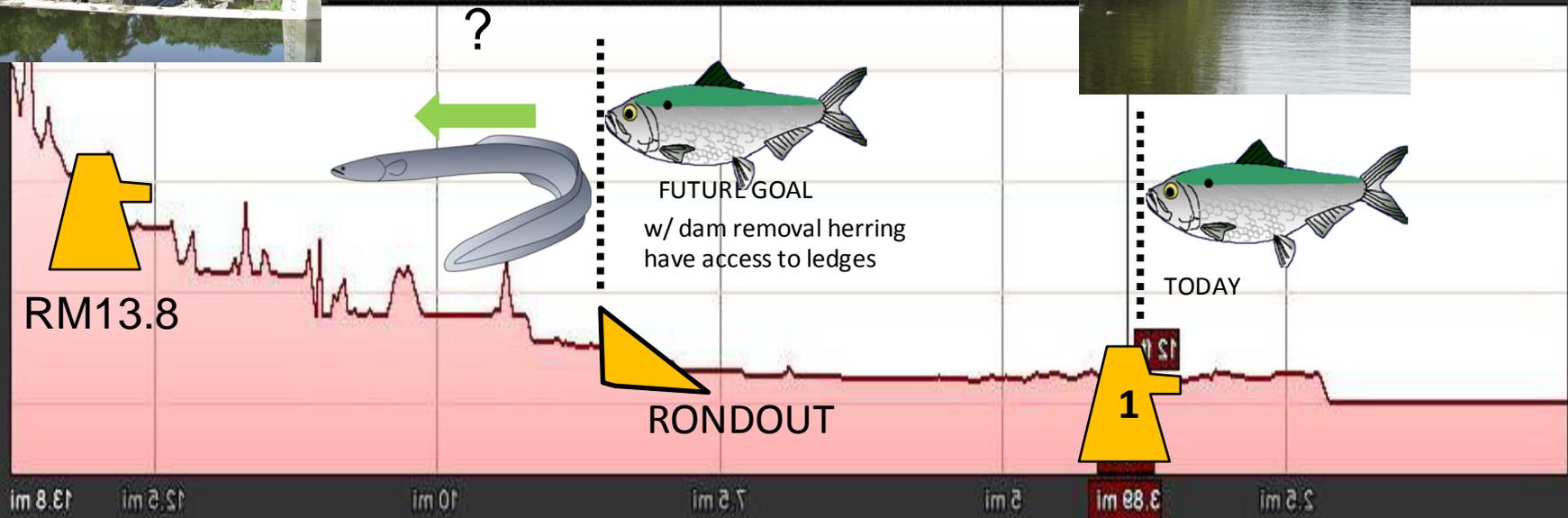


SPROUT BROOK: Fish cannot pass beyond the 1st dam.

Assuming that the Cortland Lake Dam (#3) 37' in height remains in place, removal of Dams 1 & 2 results in no more than an additional **1.22 miles** of passage for herring. An eel ladder on Dam 3 could improve upstream access .



Rondout Creek



RONDOUT CREEK: The 12' ft high Eddyville Dam (#1) stands at the head of tide. Without removing the dam, fish would have no further access beyond the base of the dam.

Removal of Dam #1 would result in head of tide migration to 3.6 miles upstream. Herring would likely pass to the natural ledges at RM 11.10 (7.1 stream miles). Eel would likely continue upstream to the next dam at RM 13.8

Study Scope: Sixty Seven Hudson Tributaries



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Crows Nest Brook	Kinderhook Creek	Popolopen Brook	Wades Brook
Crumb Elbow	Landsman Kill	Quassaic Creek	Wallkill River
Dickey Brook	Lattintown Creek	Roeliff Jansen Kill	Wappingers Creek
Esopus Creek	Maritje Kill	Rondout Creek	Wickers Creek
	Mill Creek (C)	Roseton Brook	Wynants Kill

Sixty-seven Lower Hudson Tributaries: First Barrier to River Herring --Natural or Man-made

Annsville Creek	Fallkill	Mill Creek (R)	Saw Kill
Arden Brook	Fallsburgh Creek	Minisceongo Creek	Saw Mill River
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36 Natural 28 Man-Made 2 Probable Man-Made 1 TBD

27 Tributaries Where First Barrier to Herring is Man-Made

Arden Brook
Black Creek

Foundry Brook
Furnace Brook
Gordons Brook

Mill Creek (R)
Minisceongo Creek
Moodna Creek

Saw Mill River

Claverack Creek

Murderers Creek

Sparkill Creek
Sprout Brook

Peekskill Hollow Brook

Croton River
Crows Nest Brook

Indian Kill
Kinderhook Creek

Pocantico River

Vloman Kill

Dickey Brook
Esopus Creek

Quassaic Creek

Walkkill River

Rondout Creek
Roseton Brook

Wynants Kill

Culvert
Dam

14 Tributaries Where Action for Herring Likely Prescribed

Tributaries where first man-made barrier provides realistic opportunities. Eliminated are dams under FERC relicensing; dams and culverts whose location, size and structure make fish passage costly with little benefit; culverts that are technically infeasible; and barriers that provide passage to Eel only.

Black Creek

Mill Creek (R)

Minisceongo Creek

Moodna Creek

Furnace Brook

Sparkill Creek

Sprout Brook

Claverack Creek

Peekskill Hollow Brook

Pocantico River

Croton River

Quassaic Creek

Rondout Creek

Wynants Kill

Culvert
Dam

- An estimated 35 miles additional miles of habitat gained from removal of all barriers to herring on these tributaries.
- An estimated 22.3 miles of herring habitat gained from selected tributaries 

Black Creek

Mill Creek (R)

Minisceongo Creek

Moodna Creek

Furnace Brook

Sparkill Creek

Sprout Brook

Claverack Creek

Peekskill Hollow Brook

Croton River

Pocantico River

Quassaic Creek

Rondout Creek

Wynants Kill

Culvert
Dam

Conclusions



An estimate of the stream miles encompassing the full historic migratory routes of river herring could not be determined from the available historic data, due to the limited number and accuracy of historic investigations and accounts.

There are currently 65 tributary miles estimated available to river herring on the 67 tributaries of the Lower Hudson based on criteria of biological and physical limits of fish passage.

An estimated 35 tributary miles have the potential to be opened to river herring via removal of 27 barriers (dam removal, culvert upgrades or the placement of passage structures (ramps, ladders, bypass structures)) on 14 tributaries.

Restoration opportunities (12 dams) on 5 tributaries (Claverack, Croton, Moodna, Rondout, Sparkill) could enhance access to habitat for an estimated 22.3 miles for river herring.